REMARKS

This request for reconsideration is filed in response to the Office Action dated September 1, 2009. In view of these remarks, this application should be allowed and the case passed to issue.

Claims 1-3, 9-12, 14-16, and 18 are pending in this application. Claims 1-3, 9-12, and 14-16 are rejected. Claim 18 is withdrawn pursuant to a restriction requirement. Claims 4, 5-8, 13, and 17 were previously canceled.

Restriction

Upon the allowance of the stack-type automobile cell claims, Applicants respectfully request, rejoinder, examination, and allowance of claim 18, the method of manufacturing an automobile cell, in accordance with the provisions of MPEP § 821.04.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-3, 9-12, and 14-16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shibuya et al. (U.S. Pat. No. 6,291,098) in view of Murai et al. (U.S. Pat. No.6,444,355), Takami et al. (U.S. Pat. No. 6,544,682), Yata et al. (U.S. Pat. No. 6,902,847), and Proctor (US 2,381,140). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The following is a comparison between the invention, as claimed, and the cited prior art.

An aspect of the invention, per claim 1, is a stack-type automobile cell comprising an electric power generating element, a positive electrode having a positive electrode active substance layer, a negative electrode having a negative electrode active substance layer, and a separator interposed between the positive electrode and the negative electrode. The positive electrode, the negative electrode and the separator are stacked in a stack direction to allow the

positive electrode and the negative electrode, opposing to the positive electrode via the separator, to define a unit electrode. A cell outer sheath made from a laminate film compositely composed of polymer and metal is welded to gas-tightly encapsulate the electric power generating element inside the cell outer sheath such that the stack-type automobile cell is formed in a flat shape with a thickness defined by the cell outer sheath along the stack direction. A positive electrode terminal lead electrically conductive with the positive electrode is sandwiched between welded portions formed by the cell outer sheath that has been welded and extends to an outside of the cell outer sheath. A negative electrode terminal lead electrically conductive with the negative electrode is sandwiched between welded portions formed by the cell outer sheath that has been welded and extends to the outside of the cell outer sheath. A relationship between the thickness of the stack-type automobile cell and a sum of a thickness of the positive electrode active substance layer and a thickness of the negative electrode active substance layer, along the stack direction of the unit electrodes, is defined such that a value obtained by dividing the thickness of the stack-type automobile cell by the sum of the thickness of the positive electrode active substance layer and the thickness of the negative electrode active substance layer is equal to or greater than 10 and equal to or less than 80. The positive electrode active substance layer is formed on a positive electrode current collector and the negative electrode active substance layer is formed on a negative electrode current collector such that a value obtained by dividing a thickness of the positive electrode terminal lead along the stack direction by a sum of a total thickness of the positive electrode current collector in the stack-type automobile cell is equal to or greater than 0.4 and equal to or less than 2.0. A value obtained by dividing a thickness of the negative electrode terminal lead along the stack direction by a sum of a total thickness of the negative electrode current collector in the stack-type automobile cell is equal to or greater than

0.4 and equal to or less than 2.0. A width of the positive electrode terminal lead is equal to or greater than 40 % of a length and equal to or less than 80 % of one side of the cell outer sheath from which the positive electrode terminal lead extends to the outside, and a width of the negative electrode terminal lead is equal to or greater than 40 % of a length and equal to or less than 80 % of one side of the cell outer sheath from which the negative electrode terminal lead extends to the outside. The positive electrode terminal lead and the negative electrode terminal lead extend to the outside from opposing sides of the cell outer sheath, respectively.

The Examiner asserted that Shibuya et al. disclose a thin type cell comprising positive and negative electrodes and electrode thicknesses. The Examiner indicated that Shibuya et al. do not disclose the thickness of the positive electrode current collector, electrolyte, and separator. The Examiner alleged that dividing the thickness of the cell by the thicknesses of the positive and negative electrode active material layers yields a value no greater than ~4.

In view of Murai et al.'s teaching of 30 μm thick aluminum net, the Examiner maintained that it would have been obvious to use aluminum net with a thickness of 30 μm because it's commonly known to use an aluminum current collector with this dimension to conduct current in a wound battery.

The Examiner averred that Takami et al. disclose that the positive electrode layer and the negative electrode layer each has a thickness between 10 μm and 150 μm and that is possible to improve large discharge characteristics and cycle life. The Examiner contended that it would have been obvious to make the battery of Shibuya et al. and Murai et al. with an electrode layer thicknesses between 10 μm and 150 μm for the benefit of improving cycle life and that doing so would yield a ratio of thickness of the cell by the thickness of the active substances as high as 36.4.

The Examiner alleged that it would have been obvious to stack several unit cells together to as taught by Yata et al. to increase cell capacity. However, merely stacking several unit cells does not increase cell capacity. As is well known in the art the capacity of the battery depends on whether the unit cells are electrically connected in parallel or series.

The Examiner acknowledged that Shibuya et al. as modified by Murai et al., Takami et al., and Yata et al. do not teach that the terminal leads are equal to or greater than 40% and equal to or less than 80 % of a length of one side of the cell. The Examiner noted that Proctor teaches a battery having a terminal with a large surface area for heat dissipation. The Examiner thus concluded that terminal surface area is a result effective variable and that it would have been routine skill in the art to optimize a result effective variable.

Shibuya et al., Murai et al., Takami et al., Yata et al., and Proctor whether taken alone, or in combination, do not suggest the claimed stack-type automobile cell. The cited references do not suggest that the terminal leads are equal to or greater than 40% and equal to or less than 80 % of a length of one side of the cell, that extend to the outside from opposing sides of the cell outer sheath, as required by claim 1.

Contrary to the Examiner's assertions, Proctor does not teach terminals having a large surface area for heat dissipation. Rather, Proctor discloses that large surface area battery cases and electrode plates are effective for heat dissipation. Therefore, even if Shibuya et al. was modified by Proctor, the resulting modification would be a larger surface area cell to provide increased heat dissipation, <u>not</u> a proportionally larger terminal lead relative to the cell width.

Furthermore, there is no suggestion in Proctor of terminal leads approaching any value near 40 % of the length of one side of the cell from which the lead extends to the outside. As shown in Proctor, the terminal lead widths are much less than 40 % of the side of the cell from

which the lead extends. Further, it appears as if the lead widths were anywhere near 40 % of the width of the side of the cell from which the lead extends they would interfere with each other, resulting in a short circuit.

As explained in the present specification, a terminal lead width equal to or greater than 40 % the width of the side of the cell from which it extends suppresses heat build-up in the electrode terminal lead (7, 8) during the charging and discharging cycles to enable the charging and discharging at high current, while a terminal lead width of equal to or less than 80 % ensures sufficient case sealing (specification, page 20, lines 3-8).

Proctor simply does not suggest a width of the positive electrode terminal lead is equal to or greater than 40 % of a length and equal to or less than 80 % of one side of the cell outer sheath from which the positive electrode terminal lead extends to the outside, and a width of the negative electrode terminal lead is equal to or greater than 40 % of a length and equal to or less than 80 % of one side of the cell outer sheath from which the negative electrode terminal lead extends to the outside, as required by claim 1.

The cited combination of references do not suggest the unexpected improvement in electrode terminal lead temperature, as shown in Table 2 of the present specification and the Declarations Under 37 C.F.R. § 1.132 by inventors Takaaki Abe and Osamu Shimamura filed April 25, 2008. As clearly shown in the declarations by Messers Abe and Shimamura, (see Table 2 and Exhibit 1 of the Declarations), at electrode terminal lead width/cell width (L5, L5'/L6, L6' x 100 %) less than 40 % there is a **sharp and unexpected increase** in the temperature of the electrode terminal lead. Thus, the automobile cells according to the present invention provide an **unexpected improvement** in safety **<u>not</u>** suggested by the cited references.

The Examiner noted that Declarations of Abe and Shimamura demonstrate improved results but not necessarily unexpected results. In addition, the Examiner reiterated that discovering an optimum value or workable ranges of result-effective variable involves only routine skill in the art. The Examiner's discounting of Applicants' evidence of unexpected results is strongly traversed. The evidence in Exhibit 1 clearly shows a sharp increase in the electrode terminal lead temperature. In other words, the increase is not linear. Thus, it cannot plausibly be asserted that the dramatic temperature increase is expected when the terminal lead width/cell width is decreased to less than 40%. Though the Examiner relies on MPEP § 2144.05 to assert that it would only involve routine skill to optimize a result effective variable, there is no teaching in MPEP § 2144.05 that routine optimization overcomes a showing of unexpected results. To the contrary, MPEP § 2144.05 expressly teaches that a showing of unexpected results rebuts a prima facie case of obviousness.

The Examiner has no basis and has not provided any basis for asserting that a non-linear decrease in electrode terminal temperature would have been expected. The Examiner merely deemed the decrease in electrode terminal temperature to be expected. Greater than expected results, however, are evidence of unexpected results (see MPEP § 716.02(a)).

The present claims are further distinguishable because Takami et al. and Murai et al. are directed to wound cells, while Shibuya et al., Yata et al., Proctor and the present invention are directed to a stack-type cell. It would <u>not</u> have been obvious to combine the teachings of Murai et al. and Takami et al., directed to wound cells, with the teachings of Shibuya et al., Yata et al., and Proctor, which are directed to stack-type cells. One of ordinary skill in this art attempting to solve a problem in a stack-type cell would not look towards the wound cell teaching of Murai et al. and Takami et al.

The configuration and structure of wound cells and stack-type cells are very different. Each type of cell has its own problems and concerns. Wound cells typically comprise one each of an anode and cathode. The electrodes are long and relatively thin to facilitate winding. The wound structure typically has a single anode tab and cathode tab extending from the wound structure. While in a stack-type cell there can be multiple anode and cathode plates and separator sheets and there are multiple tabs extending from the multiple electrodes. Relatively thicker electrodes can be used in a stack cell than a wound cell. Proper registration of the electrodes have to be maintained during winding or stacking. The means for ensuring proper electrode registration are different for stack-type and wound cells. Thus, the fabrication techniques are quite different for wound cells than stack-type cells. The multiple plates in stack-type cell can make electrode registration more challenging than in a wound cell. Also the multiple tabs in a stack-type cell can create more possible short circuit paths. In a wound cell electrode dimension tolerances may be of greater concern than in a stack-type cell.

The Examiner alleged that Shibuya et al., Murai et al., and Takami et al. are all in the field of applicant's endeavor and one type of cell is not taught away from another type of cell therefore the combination of references is proper. Applicants traverse. As explained above, the structural and design differences, and the problems encountered when fabricating stack-type and wound cells teach away from combining teachings of Shibuya et al., Murai et al., Takami et al., Yata et al., and Proctor.

The present claims are further distinguishable because Shibuya et al. teach (Example 1) moisture-proofing multi-layered film (4) has a width of 8 cm (80 mm), which width is a counterpart of claimed laminate width L6 (L6') (column 6, lines 63-64). Shibuya et al. further teach (column 7, line 13) that each of the cathode terminal (5) and anode terminal (6) has a width

of 5 mm, which width is the counterpart of the claimed electrode terminal width L5 (L5'). Therefore, the ratio of electrode terminal width to laminate width of Shibuya et al. is 5 mm/80 mm = 0.0625. This ratio is much lower than the claimed range of 0.4 to 0.8 (i.e., $0.4L6 \leq L5 \leq 0.8L6$ and $0.4L6' \leq L5' \leq 0.8L6'$).

Furthermore, Shibuya et al. teach (column 5, lines 25-30) that the voltage generated across both ends of the electrode terminals used as cells is not higher than 1/100 of the nominal voltage of the cell. Thus, Shibuya et al. do not remotely suggest the claimed range of 0.4 to 0.8 (i.e., $0.4L6 \leq L5 \leq 0.8L6$ and $0.4L6' \leq L5' \leq 0.8L6'$) (see page 19, line 27 to page 20, line 33 of specification).

The combination of Shibuya et al., Murai et al., Takami et al., Yata et al., and Proctor do not suggest a stack-type automobile cell comprising positive and negative electrodes wherein a relationship between the thickness of the automobile cell and a sum of a thickness of the positive electrode active substance layer and a thickness of the negative electrode active substance layer, along the stack direction of the unit electrodes, is defined such that a value obtained by dividing the thickness of the stack-type automobile cell by the sum of the thickness of the positive electrode active substance layer and the thickness of the negative electrode active substance layer is equal to or greater than 10 and equal to or less than 80, the positive electrode active substance layer is formed on a positive electrode current collector and the negative electrode active substance layer is formed on a negative electrode current collector such that a value obtained by dividing a thickness of the positive electrode terminal lead along the stack direction by a sum of a total thickness of the positive electrode current collector in the stack-type automobile cell is equal to or greater than 0.4 and equal to or less than 2.0, a value obtained by dividing a thickness of the negative electrode terminal lead along the stack direction by a sum of a total thickness of

the negative electrode current collector in the stack-type automobile cell is equal to or greater than 0.4 and equal to or less than 2.0, a width of the positive electrode terminal lead is equal to or greater than 40 % and equal to or less than 80 % of a length of one side of the cell outer sheath from which the positive electrode terminal lead extends to the outside, and a width of the negative electrode terminal lead is equal to or greater than 40 % and equal to or less than 80 % of a length of one side of the cell outer sheath from which the negative electrode terminal lead extends to the outside, and the positive electrode terminal lead and the negative electrode terminal lead extend to the outside from opposing sides of the cell outer sheath, respectively, as required by claim 1.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). There is no suggestion in Shibuya et al., Murai et al., Takami et al., Yata et al., and Proctor to modify the thickness of the stack-type automobile cell and a sum of a thickness of the positive electrode active substance layer and a thickness of the negative electrode active substance layer, along the stack direction of the unit electrodes, such that a value obtained by dividing the thickness of the stack-type automobile cell by the sum of the thickness of the positive electrode active substance layer and the thickness of the negative electrode active substance layer is equal to or greater than 10 and equal to or less than 80, the positive electrode active substance layer is formed on a positive electrode current collector and the negative electrode active substance layer is formed on a negative electrode

current collector such that a value obtained by dividing a thickness of the positive electrode terminal lead along the stack direction by a sum of a total thickness of the positive electrode current collector in the stack-type automobile cell is equal to or greater than 0.4 and equal to or less than 2.0, and a value obtained by dividing a thickness of the negative electrode terminal lead along the stack direction by a sum of a total thickness of the negative electrode current collector in the stack-type automobile cell is equal to or greater than 0.4 and equal to or less than 2.0, a width of the positive electrode terminal lead is equal to or greater than 40 % and equal to or less than 80 % of a length of one side of the cell outer sheath from which the positive electrode terminal lead extends to the outside, and a width of the negative electrode terminal lead is equal to or greater than 40 % and equal to or less than 80 % of a length of one side of the cell outer sheath from which the negative electrode terminal lead extends to the outside, and the positive electrode terminal lead and the negative electrode terminal lead extend to the outside from opposing sides of the cell outer sheath, respectively, as required by claim 1. Therefore, claim 1 is <u>not</u> obvious in view of Shibuya et al., Murai et al., Takami et al., Yata et al., and Proctor.

The mere fact that references can be combined or modified does not render the resulting combination obvious unless the prior art also suggests the desirability of the modification. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). It is submitted that Murai et al, Takami et al., Yata et al., and Proctor do not suggest the desirability of the claimed arrangement of the automobile cell of the present invention. Even if it were possible to combine the **five** cited references in such a manner by picking and choosing specific teachings from the cited references to achieve the present invention, it is submitted that the process of picking and choosing would result from an <u>impermissible hindsight reconstruction</u> of the claimed invention. There is no

suggestion in the combined references to produce an automobile cell with the specifically claimed structure.

The only teaching of the claimed stack-type automobile cell comprising positive and negative electrodes wherein a relationship between the thickness of the stack-type automobile cell and a sum of a thickness of the positive electrode active substance layer and a thickness of the negative electrode active substance layer, along the stack direction of the unit electrodes, is defined such that a value obtained by dividing the thickness of the stack-type automobile cell by the sum of the thickness of the positive electrode active substance layer and the thickness of the negative electrode active substance layer is equal to or greater than 10 and equal to or less than 80, the positive electrode active substance layer is formed on a positive electrode current collector and the negative electrode active substance layer is formed on a negative electrode current collector such that a value obtained by dividing a thickness of the positive electrode terminal lead along the stack direction by a sum of a total thickness of the positive electrode current collector in the stack-type automobile cell is equal to or greater than 0.4 and equal to or less than 2.0, and a value obtained by dividing a thickness of the negative electrode terminal lead along the stack direction by a sum of a total thickness of the negative electrode current collector in the stack-type automobile cell is equal to or greater than 0.4 and equal to or less than 2.0, a width of the positive electrode terminal lead is equal to or greater than 40 % and equal to or less than 80 % of a length of one side of the cell outer sheath from which the positive electrode terminal lead extends to the outside, and a width of the negative electrode terminal lead is equal to or greater than 40 % and equal to or less than 80 % of a length of one side of the cell outer sheath from which the negative electrode terminal lead extends to the outside, and the positive electrode terminal lead and the negative electrode terminal lead extend to the outside from

opposing sides of the cell outer sheath, respectively, is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The dependent claims are allowable for at least the same reasons as claim 1 and further distinguish the claimed stack-type automobile cell.

In view of the above remarks, Applicants submit this application allowed and the case passed to issue. If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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